

CLAIMS

[c1]

1. An apparatus for conditioning digital image data for display of the image represented thereby, the apparatus comprising:

a store for storing digital image data defining a multiplicity of pixels which together form an image;

a format data table defining a set of parameters for each of a plurality of different image displaying formats; and

an image data processor for reading the digital image data from the store, for formatting the image data depending on the set of parameters for a selected image display format, and for outputting the formatted image data for display of the image represented thereby in the selected image display format.

[c2]

2. An apparatus as claimed in claim 1, wherein the store is arranged to store digital image data for a plurality of image frames which together form at least a portion of the moving image.

[c3]

3. An apparatus as claimed in claim 2, wherein the format data table includes a set of parameters corresponding to a progressive scan format, and the store is arranged to output the frames of data to the processor in display order.

[c4]

4. The apparatus as claimed in claim 3, wherein the image data processor is capable of outputting the formatted image data in a format different than the format in which the digital image data is stored.

[c5]

5. An apparatus as claimed in claim 2, wherein the format data table includes a set of parameters corresponding to an interleaved scan format and the store is arranged to output the frames of data to the processor in an interleaved field order.

[c6]

6. An apparatus as claimed in claim 1, wherein the store is arranged to store digital image data defining a static image and the store is arranged to output the frames of data to the processor for continuous display of the static image over a period of time.

00004783 070004
T06020"EB2T0600

[c7] 7. An apparatus as claimed in claim 1, wherein the format data table is generated by software, thereby enabling the parameters to be added to, changed and updated as necessary.

[c8] 8. An apparatus as claimed in claim 1, wherein the image data processor comprises a video formatting state machine.

[c9] 9. An apparatus as claimed in claim 8, wherein the state machine includes a state in which control signals corresponding to blanking intervals are generated.

[c10] 10. An apparatus as claimed in claim 9, wherein the blanking intervals correspond to horizontal blanking intervals.

[c11] 11. An apparatus as claimed in claim 9, wherein the blanking intervals correspond to vertical blanking intervals.

[c12] 12. An apparatus as claimed in claim 8, wherein the state machine includes a state in which blanking pixels are generated.

[c13] 13. An apparatus as claimed in claim 1, further comprising a buffer between the store and the state machine.

[c14] 14. An apparatus as claimed in claim 13, wherein the buffer comprises a first-in-first-out register.

[c15] 15. An apparatus as claimed in claim 1, further comprising a projector for displaying the image represented by the formatted image data.

[c16] 16. A method of conditioning digital image data for display of the image represented thereby, the method comprising:

storing digital image data defining a multiplicity of pixels which together form an image;

defining a set of parameters for each of a plurality of different image displaying formats;

an input device for receiving image data defining a multiplicity of pixels that together form an image;

a programmable format data store for storing format data defining a format in which the image data is to be output for display of the image; and

a processor for receiving the image data from the input device and processing the same depending on the format data in the programmable format data store to generate image data including control data corresponding to the format defined by the format data in the format data store.

[c25] 25. An image data processing system as claimed in claim 24, wherein the input device comprises a buffer.

[c26] 26. An image data processing system as claimed in claim 25, wherein the buffer comprises a first-in-first-out register.

[c27] 27. An image data processing system as claimed in claim 25, wherein the input device is adapted to receive the image data in a decimated format.

[c28] 28. An image data processing system as claimed in claim 27, wherein the input device comprises separate parallel sections for receiving respective components of the decimated image data.

[c29] 29. An image data processing system as claimed in claim 24, wherein the processor comprises a video formatting state machine.

[c30] 30. An apparatus as claimed in claim 29, wherein the state machine includes a state in which control signals corresponding to blanking intervals are generated.

[c31] 31. An apparatus as claimed in claim 30, wherein the blanking intervals correspond to horizontal blanking intervals.

[c32] 32. An apparatus as claimed in claim 30, wherein the blanking intervals correspond to vertical blanking intervals.

[c33] 33. An apparatus as claimed in claim 29, wherein the state machine includes a state in which blanking pixels are generated.

[c34] 34. A method of image data processing comprising:
 receiving image data defining a multiplicity of pixels that together form an image;
 generating format data defining a format in which the image data is to be output for display of the image; and
 processing the image data from the input device depending on the format data in the programmable format data store to generate image data including control data corresponding to the format defined by the format data in the format data store.

[c35] 35. A method as claimed in claim 34, further comprising receiving the image data in a decimated format.

[c36] 36. A method as claimed in claim 35, further comprising receiving respective components of the decimated image data in parallel.

[c37] 37. A method as claimed in claim 34, further comprising generating control signals corresponding to blanking intervals.

[c38] 38. A method as claimed in claim 37, wherein the blanking intervals correspond to horizontal blanking intervals.

[c39] 39. A method as claimed in claim 37, wherein the blanking intervals correspond to vertical blanking intervals.

[c40] 40. A method as claimed in claim 34, further comprising generating blanking pixels.

[c41] 41. A digital cinema system in which image data acquired in a first format is processed to remove control data therefrom and leave stripped data defining a multiplicity of pixels that together represent an image, the stripped data is delivered to

a display sub-system together with data identifying the first format, at which display sub-system the stripped data is processed by a video processor which adds to the stripped data further data to convert the stripped data into reformatted data representing the image in a second format which is output to a display device for display of the image represented thereby.

[c42] 42. A digital cinema system as claimed in claim 41, wherein the second format is different than the first format.

[c43] 43. A digital cinema system as claimed in claim 41, wherein the stripped data is delivered to a display sub-system in scrambled form, the display sub-system comprising a descrambling circuit for descrambling the stripped data.

[c44] 44. A digital cinema system as claimed in claim 41, wherein the further data comprises data defining display blanking intervals.

[c45] 45. A digital cinema system as claimed in claim 44, wherein the display blanking intervals comprise horizontal blanking intervals.

[c46] 46. A digital cinema system as claimed in claim 44, wherein the display blanking intervals comprise vertical blanking intervals.

[c47] 47. A digital cinema system as claimed in claim 41, wherein the further data comprises data defining special codes.

[c48] 48. A digital cinema system as claimed in claim 41, wherein the further data comprises data defining blanking pixels.

[c49] 49. A video display system in which data defining an image is supplied as pixel data and is formatted before being output for display, the system comprising:
 means for storing the pixel data;
 means for reading the pixel data, from the means for storing, in display order;
 means for selecting a display format in which the image is to be displayed;

ing means, coupled to the means for reading and to processing the pixel data to create display data by adding the pixel data to the format selected for display.

A video display system as claimed in claim 49, further comprising means for storing the pixel data, coupled to the processing means and responsive to the processing means, for displaying the image represented by the display data.

A video display system as claimed in claim 49, wherein the display format comprises means for defining the control data to be added to the pixel data by the processing means.

A video display system as claimed in claim 49, wherein the display format is programmable.

A video display method in which data defining an image is formatted before being output for display, the system comprising the steps of:
storing the pixel data;
outputting the stored pixel data in display order;
selecting a display format in which the image is to be displayed;
adding the pixel data to create display data by adding the pixel data to the format selected for display.

A video display method as claimed in claim 53, further comprising the step of outputting the image represented by the display data.

A video display method as claimed in claim 53, wherein the display format comprises defining the control data to be added to the pixel data in the processing step.

A' concl.

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

[illegible]